

**CORNELL EXTENSION BULLETIN 1037**

**New York State College of Agriculture**

# **USE RECORDS TO IMPROVE YOUR DAIRY HERD**

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# USE RECORDS TO IMPROVE YOUR DAIRY HERD

J. D. BURKE AND H. R. AINSLIE

## THE NATIONAL COOPERATIVE DAIRY HERD IMPROVEMENT PROGRAM

The United States Department of Agriculture, the New York State College of Agriculture, the County Agricultural Extension Service, and the New York Dairy Herd Improvement Cooperative work together to provide you with the modern, accurate and complete herd records you need to improve your herd and to manage it at peak efficiency.

You must be a member of your county Dairy Herd Improvement Cooperative to participate in this program. If you are not already enrolled, your County Agent, DHIA supervisor, or local director will be glad to help you get started.

You have a choice of either Dairy Herd Improvement Association (DHIA) or Owner Sampler (OS) records. DHIA records are the basis of the National Sire Proving Program. They are used by other organizations for pedigrees, publicity and sales promotion. The College of Agriculture uses DHIA records for education and research. The reliability of DHIA records is verified by the DHIA supervisor who weighs and samples the milk, checks the identity of the cows, and follows the established DHIA rules in conducting each monthly test.

The owner sampler plan of testing, as the name implies, allows you to weigh your own milk and to take your own samples, thereby lowering the cost. The records provide you with exactly the same information as DHIA records and are equally valuable for herd improvement. Because OS records have not been verified by the DHIA supervisor they are not used as official records.

## **How the program operates**

Your herd will be tested one day each month. The production and other test day data will be used to compute the credits for the month. Research shows that records calculated in this manner are as accurate as recording milk weights each day. A centering day will be assigned to your herd and your herd will normally be tested within three days before or after this centering day.

Your County Dairy Herd Improvement Cooperative employs carefully trained DHIA supervisors to conduct and supervise each monthly test on your herd. He will arrive at your farm before the evening milking, but you will not know the exact day. If you are enrolled in DHIA, his duties will include weighing and sampling the milk from each cow at both the evening and morning milkings, identifying each cow, and recording the data necessary for calculating the records. On the other hand, if you are enrolled in OS he will leave a sampling kit, pre-listed barn sheet, and directions for you to weigh and sample milk and to record the test-day data. The supervisor will test the milk samples for butterfat content, and mail the completed barn sheets to the Dairy Records Processing Center. Definite procedures have been established for each type of testing.

## **The dairy records processing center**

The Animal Husbandry Department at Cornell University, Ithaca, New York, has a Data Processing Laboratory where your records are calculated and the results summarized on a Monthly Report, DHIA-200. The laboratory is equipped with modern electronic data processing machines and is staffed with skilled technicians trained in record keeping procedures.

The minute your monthly barn sheet reaches the laboratory it starts through the processing assembly line. Every step in the entire operation is geared to assure accuracy and completeness. Each report is checked. Incomplete or incorrect reports are returned to the DHIA supervisor for the necessary corrections. Records are transferred to punch cards. These cards also are verified to eliminate possible copying errors. The electronic data processing machines then go into action to calculate and print the completed Dairy Herd Improvement Record. The results are given a final inspection before they are mailed to you.



Figure 1. DHIA and OS records are processed with speed and accuracy by electronic data processing equipment.

### **YOUR DAIRY HERD IMPROVEMENT MONTHLY REPORT**

Each month the mailman delivers your Dairy Herd Improvement Monthly Report (figure 2) from the Dairy Records Processing Center. The report has been designed to provide you with essential information about each cow and an up-to-date analysis of your herd for the past 12 months. The information on each cow is divided into three parts: test-day data, current test period, and lactation to date.

#### **Test-Day Data**

Under test-day data you will find the identification, breed, dates affecting record, daily milk weight, percent test, concentrates fed and concentrates indicated. An explanation of *Notes* and *Codes* will be found at the bottom of each page.

#### **Concentrates Indicated**

A comparison of the pounds of concentrates indicated with the pounds you were feeding each cow will show where improvements can be made.



The amount of concentrates needed by each cow will depend on the daily milk production, butterfat test, bodyweight, and on the amount, kind, and quality of roughage consumed each day. All of the above factors have been considered in calculating the pounds of concentrates indicated.

### **Current Test Period**

Under the column headed *Current Test Period* you will find the days in milk, pounds of milk, and pounds of butterfat credited to each cow for the current testing period. Your testing period extends back 15 days before your centering day and extends forward 13, 14, 15 or 16 days, including the centering day. The beginning and end of the testing period is shown at the top of your report. Days in milk are adjusted for cows that have calved, dried off, entered the herd, or left the herd since the previous month's test.

### **Lactation to Date**

A new record is started on each cow on the fourth day after calving or when a new cow enters the herd. Each month the credits for the current test period are added to the previous month's lactation to date to bring the current totals up-to-date. The record is terminated when a cow calves again or leaves the herd.

Age in months and bodyweight at calving, length of previous dry period and days carried calf are calculated to aid in evaluating the record. Value of product and income over feed cost based on production, prices, and feed consumed are calculated for each cow.

When a cow has milked 305 days, dried off, or left the herd, a special first 305-day lactation record is calculated, printed and filed for sire proving. Such records will be indicated on the report by a symbol (#) in the column, *Conditions Affecting Records*. The first 305-day lactation record and the complete or terminated record should be transferred to the *Lifetime Record of Individual Cow* page in your permanent herd book.

### **Herd Summary**

A production analysis of your herd will be found at the top of your report. The first line (daily average per cow this month) shows the daily average per cow for the current test period. The second line (12 months herd totals) shows the total production, feed consumed, value of product, feed costs, and income over feed costs for the past 12 months. The third

STARTED	
MONTH	YEAR
08	36

New York Dairy Herd Improvement Cooperative, Inc.  
**LIFETIME RECORD OF INDIVIDUAL COW**

STARTED	
MONTH	YEAR

Registration Name Burke's Triune Bella Registration Number 3837849  
 Bred Bella Tattoo Number            Progeny of Artif. Insem. ? ☒  
 Birth Date 3-9 Type            Eartag Number 212AD5873  
 Breed R.H. 1953 Classification            Secondary Eartag             
 Sire Graymar Triune Model Beesie Eartag or Reg. No. 958619  
 Dam Burke's Lady Beata Index Number 0001 Eartag or Reg. No. 2531822

Lact. No.	DATE FRESH			RECORD OF TEST DAY MILK WEIGHTS										365 DAY MATURE EQUIVALENT		OR — STABLEMATE AVERAGE	
				MONTH OF LACTATION													
	MO.	DAY	YR.	1	2	3	4	5	6	7	8	9	10	MILK	B.F.	MILK	B.F.
1	10	1	55	46	42	47	42	41	39	35	37	37	34	15200	569	+200	+61
2	12	20	56	69	67	67	56	57	49	41	34	21	9	16870	627	+1500	+120
3	1	22	58	54	67	66	64	57	55	45	32	18		15370	580	+350	+70
4	1	2	59	69	73												
5																	
6																	
7																	
8																	
9																	
10																	

**LACTATION PRODUCTION SUMMARY**

Lact. No.	Type of Record	FIRST 365 DAYS										COMPLETE LACTATION		
		Age at Calving (Months)	Weight When Fresh	Days Dry Before Calving	Days Carried Calf	Days Milked 32	MILK	%	B.F.	Days in Milk	LACTATION/LIFETIME TOTALS	MILK	B.F.	Income Above P.C.
1	DHIA	30	12		182		12260	3.7	459	378	14110	530	450	
2	"	45	14	36	190		15080	3.7	560	307	15100	561	470	
3	"	58	14	91	216		14780	3.8	558	278	14780	558	460	
4											43990	1649	460	
5														
6														
7														
8														
9														
10														

Figure 3. A Lifetime Record is provided for each cow. Completed records are copied from the monthly report.

line (12 month herd average) is a herd average for the past 12 months. Thus your production analysis is always up-to-date as of the current month.

### LIFETIME RECORDS

A permanent herd record book with individual pages for each cow, *Lifetime Record of Individual Cow NYDHIC-57*, is available. This page (figure 3) provides for complete identification, test-day milk weights, lactation production summary, calving record, breeding record, health and veterinary record.

The complete identification record should be completed when the cow enters the herd. Breed registration certificates, previous herd books, and artificial breeding receipts are potential sources of identification information.

Test-day milk weights for each month of the lactation are copied directly from the barn pages on test day. These milk weights enable you to compare production month by month through the lactation, or with corresponding months of previous lactations. It is important that you note any abnormal drop in production from the previous months. Production drops may be the result of underfeeding, adverse management, sickness or injury. Compare the production of each cow to normal lactation curves as shown in figures 4 and 5.

The first 305-day lactation record together with the type of record, age, bodyweight, days dry before calving, days carried calf and days milked three times are copied directly from the monthly record, *DHIA-200*. These records are indicated with a symbol (#) in the *Conditions Affecting Records* column.

The complete or terminated record includes the production and feed from one calving to the next. Copy the days in milk, fat and income over feed cost when a terminated record is indicated by a symbol (□) in the *Conditions Affecting Record* column. The addition of these complete lactation records will show the total lifetime production for each cow.

The calving record provides space to record the essential information on the progeny of each cow. This information must be recorded within 60 days after each calf is born.

You and your veterinarian should work together in maintaining the health and veterinary record. A complete record of previous illness, injuries, reproductive history, and treatments is most helpful in diagnosing current and future health problems.

## **FEED FOR EFFICIENT PRODUCTION**

Too often, all cows in a herd are fed about the same, or at a constant grain to milk ratio. This practice results in underfeeding high-producing cows and overfeeding low-producing cows. In many cases a redistribution of the same total concentrates fed the herd will result in increased production at no additional cost. The amount, kind, and quality of feeds used account for most of the differences in production among herds of the same breed. Improvement in feeding practices usually results in an immediate increase in production.

Cows need to be fed the right amounts and kinds of nutrients to meet their requirements for maintenance, production, growth and reproduction each day. Since net energy (NE) is the biggest single requirement, it largely determines the total pounds of feed needed. The ration should be balanced by choice of ingredients to provide the required amounts of protein, fat, minerals and vitamins.

The records of daily production, butterfat tests, and bodyweights make it possible to estimate accurately the total energy requirements of each cow. The net energy supplied by roughage can be calculated from the pounds, quality, and dry matter content of each roughage consumed. The difference between the net energy required and that furnished by roughage must be supplied by concentrates.

### **Rate of Roughage Feeding**

Liberal feeding of high quality roughage is the basis of a good feeding program. The rate of roughage feeding is the total pounds of good hay equivalent consumed each day per 100 pounds of bodyweight. The good hay equivalent of each roughage is the pounds of good hay that would be required to furnish an equal amount of net energy.

Cows may be expected to consume roughage at a 3.0 pound rate if they are fed excellent quality forage. A 2.5 pound rate may be expected when cows are fed roughage of good quality under usual barn feeding conditions. Rates of 2.0 pounds or less may result when roughage feeding is restricted or only low quality roughage is provided.

To attain a high rate of roughage feeding you need to have all your first cutting hay harvested before full bloom. Corn silage must be well-eared and harvested at the dented to hard dough stage of maturity. In summer you need lush, rapidly growing pastures, grazed in the vegetative or leafy stage. Supplementary feeding of hay or silage in mangers or bunks will be needed when pastures of top quality are not available.

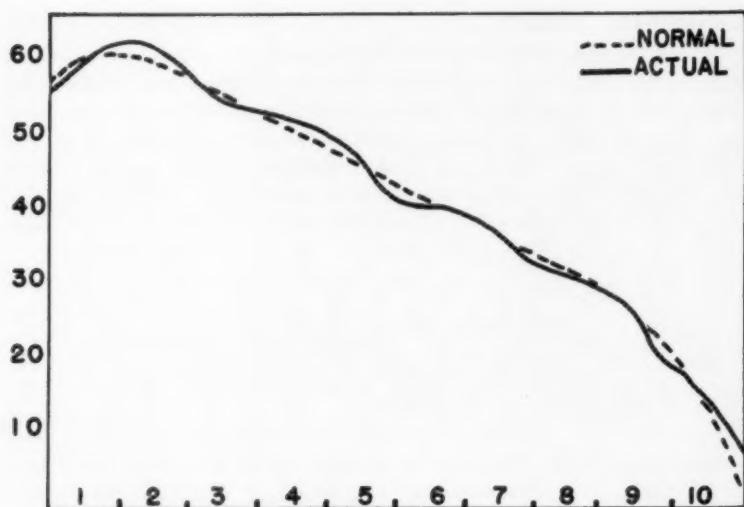


Figure 4. Good feeding and management enable cows to produce up to their inherited capacity during each month of lactation.

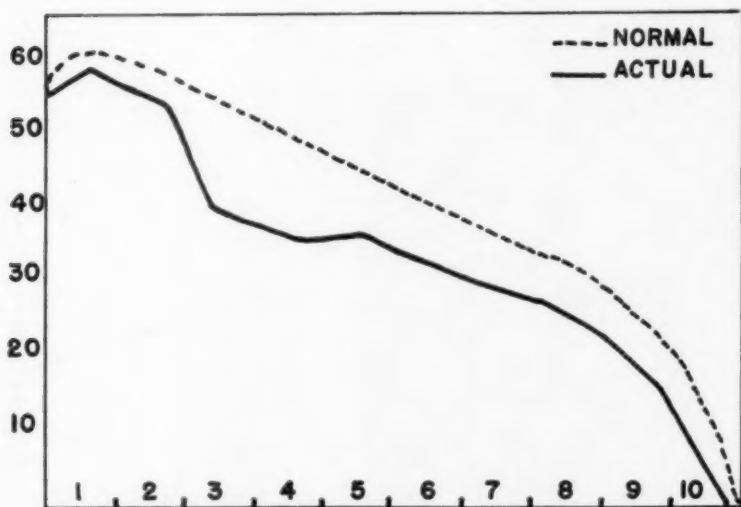


Figure 5. Underfeeding or poor management usually causes an abnormal drop in production early in lactation.

## Concentrate Feeding

It is apparent that increased consumption of high quality forages reduces the amount of concentrates needed for a given production level. The *Concentrates Indicated* column on your monthly report is an excellent guide to the pounds of concentrates to feed each cow. Obviously exact reporting of the amounts, kind, quality, and dry matter content of roughages consumed is extremely important. Errors in evaluating roughage quality or weights will affect concentrates indicated as follows:

Error in reporting

2 pounds of hay

5 pounds of silage

1 quality grade

2 percent in dry matter

100 pounds in bodyweight

each will cause

about one pound error

in concentrates indicated

You will need to consider individual cow variations in appetite, body condition, and udder health. The important point is to be sure that high-producing cows get enough feed and that feed is not wasted on low-producing cows.

**NET ENERGY  
REQUIRED  
PER CWT  
OF MILK**

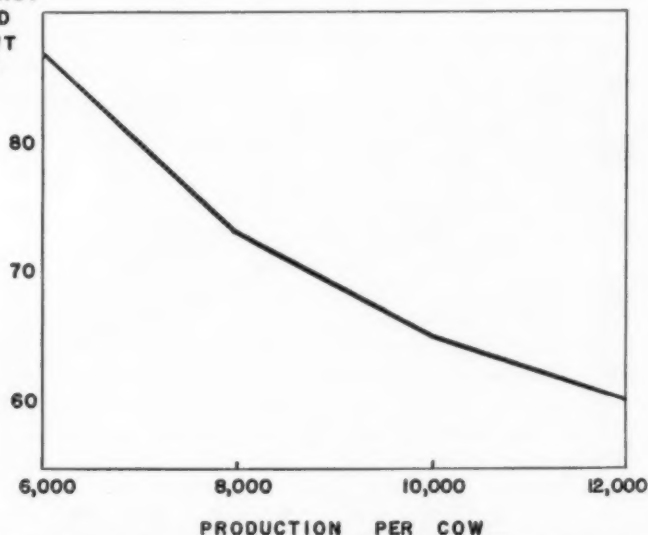


Figure 6. High producing cows use feed more efficiently than do low producing cows.

## Control Feed Costs

Feed costs account for about 50 percent of the total cost of producing milk. These costs can be controlled best by feeding according to each cow's requirements, by increased feed efficiency, and by maximum use of low cost nutrients. Underfeeding is more likely to reduce both production and *Income Over Feed Costs*.

High-producing cows utilize feed more efficiently than do low-producing cows. The maintenance or overhead requirement is the same for cows of equal size. The feed requirements increase as production increases, but the proportion of total feed fed used for production increases more rapidly (figure 6).

Hay, silage, and pasture are usually a lower cost source of net energy than concentrates. When good hay or its equivalent in other roughages costs less than one-half the price of concentrates, it becomes important that roughage furnish 60 percent to 80 percent of the total net energy fed the herd.

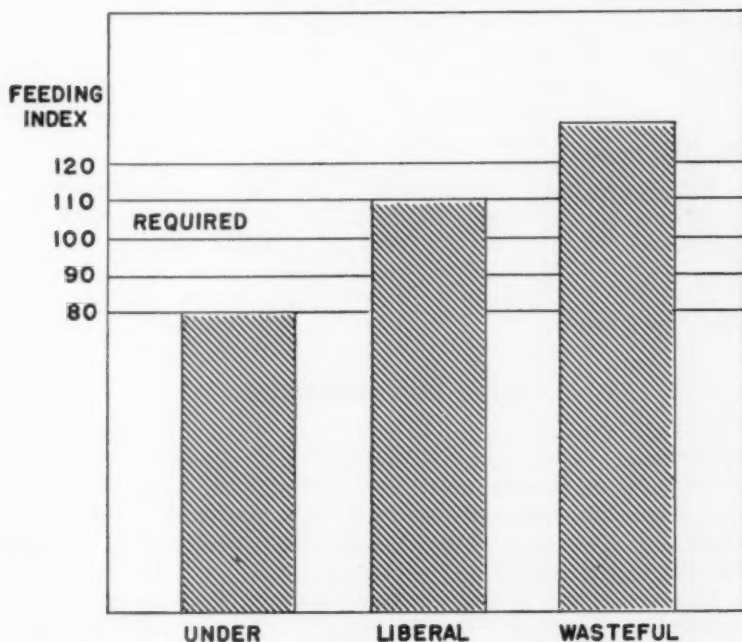


Figure 7. It pays to feed cows liberal but not wasteful amounts of feed.



Figure 8. Good dairy cows have the ability to convert large quantities of feed into milk.

### Feeding Index

The *Feeding Index* ( $\text{total net energy fed} \div \text{total net energy required} \times 100$ ) indicates how closely you have come to supplying the total feed requirements of your herd. An index of 100 results when the total net energy fed equals the total net energy required. An index of 110 to 115 is desirable to allow for growth, conditioning of dry cows and full opportunity for production (figure 7).

### BREED FOR PRODUCTION

It takes dairy cows to make a dairy herd. The dairy cow has many characteristics, but above all she must have the ability to consume large quantities of feed and to convert this feed into milk. Production records help you to rank your cows according to their productive ability. You can improve your herd by raising replacements from the superior cows and culling the inferior and unprofitable ones.

Each new crop of heifers that you add to your herd as replacements should be a genetic improvement over the cows that you have culled. These heifers will have received one-half of their inheritance from their

dams and one-half from their sires. The sire is the principal means of adding new and improved genetic factors to the herd.

Each sire used in your herd demonstrates his ability to transmit production and other dairy characteristics through the performance of his daughters. The more daughters of a sire you have milking in your herd, the easier it is for you to predict the production of future daughters.

### **Proved Sires**

A DHIA proof is issued on sires used in DHIA herds when sufficient records have been accumulated to make daughter-dam comparisons on ten or more pairs. Preliminary DHIA proofs are issued when five but less than ten daughter-dam pairs are available.

Another method of measuring a sire's ability to transmit production is to compare his daughters with their stablemates. Stablemates are the other cows in the herd that made their records in the same year and season (figure 9).

### **Use the Best Sires Available**

An Artificial Breeding (AB) proof or an AB stablemate comparison is the most accurate method of ranking sires because these proofs include records on many daughters. Because these daughters are likely to be located in many different herds, the environmental influences that are difficult to measure tend to be cancelled or reduced.

Your best choice in light of present knowledge is to breed most of your herd to AB proved sires that rank well above breed average. Your second choice would be a sire proved in your own herd. You and other breeders must breed some of your cows to carefully selected sons of high ranking proved sires in order to have a choice of AB proved sires for future use.

## **COW EVALUATION**

The actual production of each cow in your herd measures her contribution to the total herd production. If you are to make genetic improvements, you must evaluate each cow against her stablemates. Not only do you need to evaluate your cows from the standpoint of production, but you need to consider the net income each cow contributes to your total income, her reproductive ability, health, milking qualities, disposition, and body conformation or type. The availability of replacements is also a consideration when cows are candidates for culling. Table 1 is designed to aid you in evaluating each cow in your herd.

1 - Dtr. of NYABC Sing  
7 - Dtr. of ABS Sing  
9 - Dtr. of Curtis Candy Sing  
Blank - Result of Natural Service

NAME  
SMITH ST  
ROUTE OR STREET  
SMITHVILLE USA  
POST OFFICE  
AUG. 58 NOV.

POST OFFICE  
COWS FRESHENING FROM  
AUG. 58 TO NOV. 58

STABLEMATE COMPARISON  
NEW YORK STATE COLLEGE OF AGRICULTURE  
CORNELL UNIVERSITY ANIMAL HUSBANDRY DEPARTMENT  
21 99 666  
Cordis

**CONDITIONS AFFECTING RECORD**

1. Estimated
2. Sold for Dairy
3. Died or Sold for Beef
4. Injury
5. Mastitis
6. Ketosis
7. Other Sickness
8. Abortion
9. Nurse Cow

Figure 9. A stablemate comparison shows how each cow has produced in comparison to other cows in the herd.

Table 1. Cow Evaluation

	Select		Cull
	High	Average	Low
Production .....	Above stablemates	Equal to stablemates	Below stablemates
Daughters production .....			
Income over feed costs .....			
Calving interval (months) .....	11-12	13-14	15+
Health and injuries .....	Good	Temporary	Chronic
Milking qualities .....	Fast	Medium	Slow
Disposition .....	Quiet	Not easily excitable	Nervous or dull
Type score .....	85+	84-75	75-
Replacements available .....	No	Soon	Yes

To evaluate cows for their relative productive merit in your herd, the records should be standardized to a 2X, 305-day mature equivalent basis. This is an attempt to eliminate variable influences that will bias your judgment if overlooked. Each animal is then compared to her stablemates (see figure 9). If a cow has producing daughters in the herd, they should be compared to their stablemates.

The reproductive performance of each cow can be measured best by the interval between calves. A goal all dairymen should strive for is to have each cow calve every 12 months.

For economical production, a cow must be in good health and free from injury and disease. Because labor is another large expense, you need cows that will milk completely in four to five minutes. Slow or hard milkers will upset good milking procedures for other cows in the herd. Cows with a gentle disposition are easier to work with and make the daily task more enjoyable.

In general, cows that are consistently rated in the high or average group would be retained in the herd and replacement stock selected from them. Cows that are consistently rated in the low group should be culled and heifer calves from this group should not be raised for replacements.

When cows are culled from the herd, replacements are needed to maintain the number of milking animals at a constant figure. If no replacements are available, your decision to cull a poor cow from your herd may be altered. It seldom pays, however, to keep a cow that does not return a satisfactory income over feed costs.

Sound, well-attached udders, deep bodies, good legs, and straight top lines add to the value of the cow when sold for dairy purposes.

## REPLACEMENTS

The number of replacements needed each year to maintain herd size will depend upon the number of cows eliminated from your herd because of disease, injury, low production or poor type. Normal turnover in DHIA herds has been 20 to 25 percent each year. To allow some opportunity for culling undesirable first calf heifers, it is necessary to raise approximately one-third as many heifer calves each year as there are milking animals in the herd.

If you are expanding your business, you will undoubtedly raise all your heifers and cull the undesirable ones after they freshen. There is usually a demand for good dairy cows with production records, and the sale of surplus cows and heifers can be an important source of additional income.

If you raise rather than purchase your replacements, you are in a better position to evaluate the animals genetically, because their dams and close relatives have produced in your herd under your feeding and management conditions. There is also less opportunity of introducing disease into your herd when replacements are raised rather than purchased.

If your milk sales pay you a higher return on labor, feed, and capital, however, it would be good business to milk more cows and purchase the needed replacements. Some dairymen have solved this problem by contracting the raising of heifers with farmers who are not in a position to produce milk.

Research studies at Cornell and farm cost account figures give some indication of the amount of feed required and labor involved in raising dairy animals from birth to first freshening. These data are summarized in table 2. Feed and labor costs represent approximately 70 percent of the total cost of raising heifers. Other costs would include equipment, power, buildings, breeding fees, insurance, and interest.

**Table 2. Feed and labor per animal required to raise dairy replacements from birth to first calving<sup>1</sup>**

	Farm cost accounts <sup>2</sup>	Mt. Pleasant farm research Cornell
Milk (pounds).....	323	350
Concentrates (pounds).....	1706	624
Hay (tons).....	2.6	3.4
Silage (tons).....	1.8	4.2
Pasture (days).....	—	230
Bedding (tons).....	0.5	1.0
Labor (hours).....	42	66

<sup>1</sup>Average age at freshening 27.5 months

<sup>2</sup>Farm cost accounts, AE Res 5, 1958

### Size of Cow Important

Many conditions contribute to high economical production per cow. Among these is the size or bodyweight of the cow at freshening time. Size is important in your first calf heifers both from the standpoint of ease of calving and greater production during the first and subsequent lactations.

A well-grown two-year-old will calve with less difficulty, will start at a higher level of production, and will hold that production for a longer period of time than a poorly grown heifer. Size is more important than age in deciding when to breed yearling heifers. Research indicates that it may be possible to take advantage of this fact and breed your dairy heifers at a younger age, provided they have adequate growth.

Table 3 indicates the weights at which dairy animals should be bred, and the bodyweight at which they should freshen if growth continues at a satisfactory rate until calving time.

**Table 3. When to breed yearling heifers**

	Breed at these weights	Calve at these weights
	pounds	pounds
Brown Swiss and Holstein.....	750-850	1100-1200
Ayrshire.....	600-700	850-950
Guernsey.....	550-650	800-900
Jersey.....	500-600	700-800

Table 4. Relation of bodyweight to other factors\*

Breed	Group	Body weight	4 percent fat corrected milk	Income over feed cost
		pounds	pounds	dollars
Ayrshire.....	High	1,190	8,880	227
194 herds.....	Low	990	7,940	181
Brown Swiss.....	High	1,340	9,910	260
70 herds.....	Low	1,050	8,570	186
Guernsey.....	High	1,140	9,320	255
296 herds.....	Low	900	8,200	212
Jersey.....	High	990	8,820	221
170 herds.....	Low	800	7,960	184
Holstein.....	High	1,320	11,020	275
2493 herds.....	Low	1,110	8,980	208

\*New York DHIA Results — 1955

DHIA herd data were sorted into 20 percent groups from high to low. Data in table 4 represent the high and low groups for each major dairy cattle breed.

The average increase in production per 100 pound increase in bodyweight varies among breeds from 460 pounds of milk to 970 pounds of milk.

A study of New York DHIA results shows that even though the larger cows within a breed consume more nutrients, they usually produce at a higher level and show a greater return over feed cost than do the smaller cows in the same breed. These data are summarized in table 4.

### BREEDING FOR EFFICIENCY

Reproductive efficiency is largely dependent on keeping a complete stable breeding record of heat periods, service dates and due dates on each cow in your herd. Table 5 shows the effect of calving intervals on butterfat production for a single lactation and for a five year total.

Table 5. Effect of calving intervals on butterfat production for a single lactation and five-year total\*

Calving interval	Butterfat production	
	Single lactation	Five-year total
months	pounds	pounds
12.....	368	1,840
13.....	385	1,774
14.....	395	1,690
15.....	395	1,580

\*Reymann Memorial Ayrshire Herd, University of West Virginia

Table 6. The effect of length of dry period on production in subsequent lactations\*

Length of dry period	Production in next lactation	
	Milk	Butterfat
	pounds	pounds
Less than 2 weeks.....	9,511	347
2-4 weeks.....	10,838	390
4-6 weeks.....	11,218	404
6-8 weeks.....	11,567	413
Over 8 weeks.....	No advantage over 8 weeks dry period	

\*Michigan DHIA results.

Even though the production per lactation is higher at a 14 to 15 month calving interval than it is at a 12-month calving interval, the five year total butterfat production is less. At the end of five years, each cow on a 12 month calving interval would have one more complete lactation than if the cow had calved every 15 months.

The services required per conception will be less when cows are bred after 60 days following calving than if bred sooner. Most cows will settle on first service, and enough will settle on the second service that approximately 96 percent of your cows will have conceived, and, if the calf is carried to term, will have a 12 to 13 month calving interval.

An adequate dry period between lactations is also necessary for best production results. The data in table 6 clearly indicate that a dry period of less than two weeks curtails production on the average, by 2,000 pounds

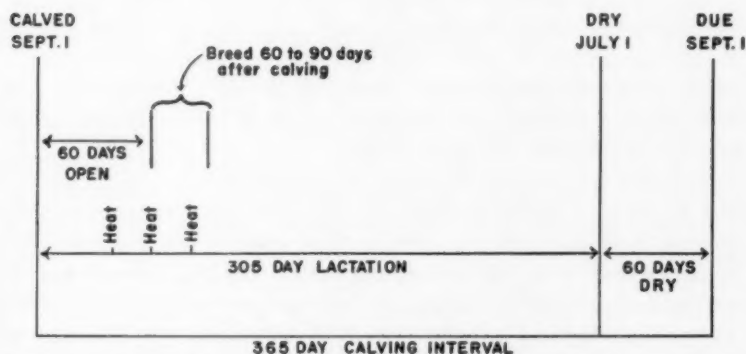


Figure 10. Breed for a 305-day lactation, a 60-day dry period and at least a 60-day open period.

of milk when compared to a six- to eight-week dry period. For most cows, no apparent advantage is noticed in dry periods longer than eight weeks.

Built into the central processing DHIA and OS records are some check points to aid you in breeding your cows for a 12 to 13 month calving interval, and to insure an adequate dry period. When a cow has been open for 60 days after freshening, an asterisk (\*) is printed along with the days in milk since fresh. This is to remind you that the cow should be bred on the next heat period if she has recovered from calving.

When the supervisor reports a breeding date, the electronic data processing machines will calculate the days carried calf. This is always calculated from the last breeding date reported for each cow to the end of the current test period. When the days carried calf reaches 200, an asterisk (\*) will be printed, along with the number of days, provided the cow is not already dry. This is a reminder to you that if this cow is to have a 60 day dry period, she should be dried off when she has carried calf 220 days.

Figure 10 may be helpful in planning a 60 to 90 day open period, a 305-day lactation and a 60-day dry period for the majority of your cows.

### **EFFECT OF MARKET AND SEASON OF FRESHENING**

As a dairyman, you often feel that there is little or nothing you can do as an individual to influence the price you receive for your milk. Usually, the price received for milk is established by the milk marketing orders and is determined by the percent of milk sold for fluid consumption and the percent going into manufactured products. A wisely planned dairy program can capitalize on the market, however, even though a single individual cannot always determine the price received for milk sold. Figure 11 shows the relationship between season of freshening, production per cow and price of milk.

Note that cows that calve during the fall and winter months produce at a higher level on the average than cows that calve during the spring months. Note also that the price of milk received per hundredweight is highest during the fall and winter months. To capitalize on this situation, a wise dairyman will plan to have a majority of his cows freshen when the price of milk is highest. Not only do you gain from the increased production per cow, but also from the fact that the bulk of production is made when the price is highest.

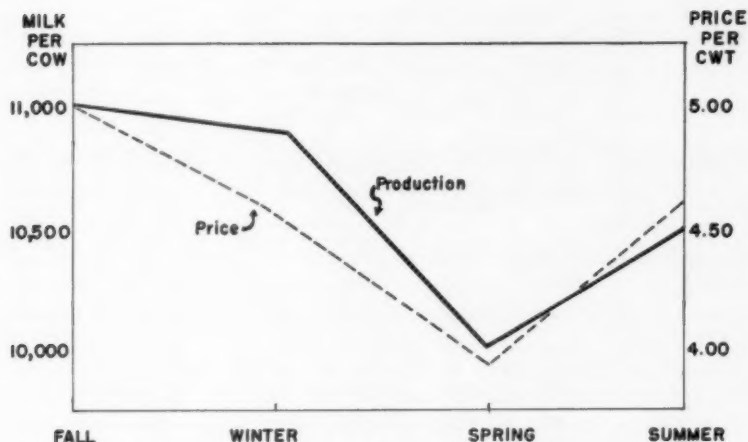


Figure 11. It pays to have cows calve when the milk price is highest.

There are, however, special markets in which the price is higher in other months than in the fall. In this situation, a dairyman would want to alter his calving schedule to fit his particular market. It is not an easy task to have the majority of your cows calve at a specified time each year. You can breed first calf heifers to calve at a desired time more easily than you can change the calving pattern of your older cows.

### SIZE OF BUSINESS

To operate successfully, any business must handle a volume large enough to provide adequate income. A 36-cow dairy producing 10,358 pounds of milk per cow in 1958 was average for New York DHIA herds. DHIA herds are getting larger and the average production per cow continues to move upward. High production per cow and a relatively large number of cows per herd are important factors in obtaining a high income or total value of product. The data in table 7 show that a herd must be above average in production and in number of cows to realize at least \$20,000 income annually. Each additional thousand pounds of milk per cow increases the annual income by \$45.00 per cow. Your first step in realizing a high income is to improve the production per cow and secondly, to increase the number of good cows in your herd.

Table 7. Relationship of production and herd size to total value of product\*

Milk per cow	Cows per herd					
	20	30	40	50	60	70
pounds	dollars	dollars	Value of product dollars	dollars	dollars	dollars
13,000.....	11,700	17,550	23,400	29,250	35,100	40,950
12,000.....	10,800	16,200	21,600	27,000	32,400	37,800
11,000.....	9,900	14,850	19,800	24,750	29,700	34,650
10,000.....	9,000	13,500	18,000	22,500	27,000	31,500
9,000.....	8,100	12,150	16,200	20,250	24,300	28,350
8,000.....	7,200	10,800	14,400	18,000	21,600	25,200
7,000.....	6,300	9,450	12,600	15,750	18,900	22,050

\*New York DHIA results, 1958

Total volume or size of business is not the only criteria for measuring efficiency of a dairy farm operation. Other considerations would be milk production per cow, milk production per man, and feed costs per 100 pounds of milk produced. Data in table 8 emphasize that high income

Table 8. Factors affecting income over feed costs per man\*

Breed	Group	Income over feed cost per man	Milk per man	Cow years	Milk per cow	Feed cost per 100 pounds milk
		dollars	pounds		pounds	dollars
Ayrshire.....	High	5,510	210,000	40.2	9,010	2.09
	Low	1,640	103,000	24.7	7,930	2.28
Brown Swiss...	High	5,270	197,000	27.4	9,940	1.93
	Low	1,960	110,000	27.5	8,170	2.30
Guernsey.....	High	6,700	199,000	38.6	8,380	2.32
	Low	2,040	84,000	24.2	7,600	2.40
Jersey.....	High	5,480	172,000	38.8	7,690	2.30
	Low	1,680	72,000	20.7	6,480	2.81
Holstein.....	High	6,260	257,000	38.2	11,600	1.88
	Low	2,160	123,000	26.3	9,700	2.15

\*New York DHIA results - 1955

DHIA data were sorted into 20 percent groups from high to low. Data in table 8 represent the high and low groups for each major dairy cattle breed.

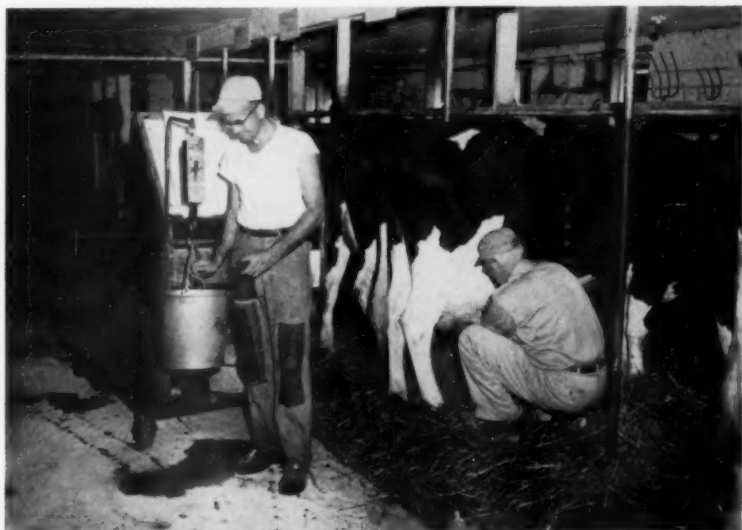
over feed costs per man is closely correlated to relatively high production per man, high production per cow, a relatively large herd and low feed cost per hundred pounds of milk produced. You will notice that these correlations exist regardless of the breed of cow.

## **WHAT WE NEED TO KNOW ABOUT YOUR COWS AND HERD TO CALCULATE RECORDS**

### **Production Data**

The total production of each cow for a 24-hour period is determined by weighing the evening and morning milk to the nearest tenth of a pound. Monthly credits are calculated by multiplying daily production by the number of days each cow is in milk.

A composite sample (about an ounce from evening and morning milk) is used to test for butterfat content. Each milking must be thoroughly mixed before sampling. Pour the milk from one pail to another three times. Sample bottles must be numbered and identified to assure that each cow is credited with her own sample. Butterfat production is calculated by multiplying total milk for the month by the butterfat test.



*Figure 12. Adjust the milk scale for the weight of the pail. Weigh and record milk weights to the nearest tenth pound.*

Weighing and sampling devices are available for herds using pipeline milkers. These are usually owned by the county dairy herd improvement cooperatives and rented to the member on test day.

### Essential Dates

Production credits start on the fourth day after calving, counting the calving date as the first day. Credits end on the last day that the cow is milked at least once a day. Therefore all calving and dry dates must be recorded and reported. Cows that are purchased or leave the herd receive credit for the exact days that they are in the herd. Purchase, sold or died dates also must be recorded and reported. Breeding dates show the start of gestation and are necessary to calculate *Days Carried Calf*.

A stable breeding chart located in the barn with a pencil attached makes it easy to jot down events as they occur. Essential dates then can be transferred to the prelisted barn sheet on test day. Record the month and day together with the appropriate code in the column headed *Status*. Use the upper space for the first date and the lower space for the second date if more than one date occurs.

It is practical to find the average barn or rack fed roughage consumed per cow per day. Average the weights of several bales, baskets, or cartloads of each kind of roughage. Then multiply the average weight by the number fed to the milking herd during a 24 hour period. Allow for the amount refused or swept from the manger. Divide by the number of cows. *Example:*

	one bale	50	pounds
	one bale	45	pounds
	one bale	40	pounds
		3/135	
		45	average weight
Multiply		10	bales fed the herd each day
		450	
Subtract		50	hay swept from the manger
Divide	20/400		number of cows
		20	pounds of hay per cow each day

When roughages are self-fed from stacks or bunkers, the amount can be estimated by the disappearance. You can estimate the capacity of mows, stacks or silos from tables such as those on *DHIA Form 10* in your herd record book.



Figure 13. Weigh or estimate the pounds of each feed consumed per cow on test day.

## Roughage Quality

The date harvested or stage of maturity is the best guide to the feeding value of barn or rack fed roughages. Hay, grass silage, or green feed decreases about one-half of one percent in feeding value each day from the start of growth in the spring. Corn silage increases in feeding value with increasing maturity because of the larger proportion of grain to stalk and leaves, and to the decrease in moisture.

Figure 14 shows the relation between harvesting date and the feeding value of hay. A *Forage Harvesting Record, DHIA-49*, showing the date harvested, method, and treatment makes it easy to record each lot of roughage at harvest time.

Each month, record on the top line of the barn page the average daily consumption, quality code, and percent of dry matter for each feed given the herd. Your DHIA supervisor is trained to assist you in making an accurate appraisal of your roughage feeding each month.

## Prices

Feed prices, milk prices, and butterfat differential are needed each month to calculate feed cost, value of product, and income over feed

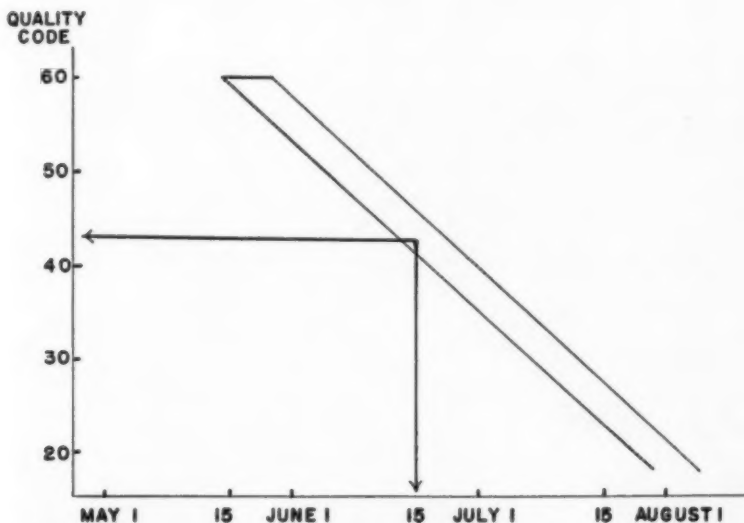


Figure 14. Note the dates you cut your hay. This is the key to determine hay quality. Hay cut on June 15 has a quality code of 43.

cost. Use the net cost of concentrates delivered to the bin. Include the cost of grinding and mixing when homegrown grains are used. Your DHIA supervisor can help you figure the cost of each mixture.

Report the price of good hay each month regardless of the kind of roughage being fed. Silages, green feed, and other roughages will be converted to their good hay equivalent value and priced accordingly. Pasture will be priced at one-half its good hay equivalent value. The price used for good hay should represent the weighted cost of providing both purchased and homegrown roughage for the herd.

The last milk price available or a projected price should be recorded for each month. However, use the same method each time. Base or plant price, test and butterfat differential will be needed. These may be taken from the milk plant statement each month.

### **Labor**

The total amount of labor devoted to the dairy enterprise should be reported each month in total work days. Include all labor used for feed production, maintenance, barn work, and hired custom work. Do not include work off the farm, work done on cash crops or other livestock enterprises. Count the operator's time, full-time employees, day labor, and family help. Total work days for the year divided by 365 equals the number of workers.

### **Identification**

Accurate and permanent identification of each animal in the herd together with a record of sire, dam, and birthdate is required. DHIA rules require that all animals be positively identified within 60 days after entering the herd by birth or purchase. Acceptable identifications are breed registration numbers, DHIA, disease or artificial breeding ear-tags. All ear tags must have a two digit state code, triple letter prefix, four digit cow number (21-WAZ-9999).

Your DHIA supervisor will ear tag all calves born since the previous month's test and record the information in your DHIA Herd Book on the *Herd Register and Calf Record*, NYDHIC-16, and in the calving record of each *Lifetime Record of Individual Cow*, DHIC-57.

Cow index numbers (0001 to 9999) are assigned to each cow enrolled in central processing. These numbers are never duplicated. Quick and positive identification of each cow at milking time is easy if these index numbers are posted above each cow's stall. Neck chain numbers corresponding to these index numbers simplify identification if cows do not have regular stalls or are in loose housing.



Figure 15. DHIA eartags are used for permanent identification of the animals in your herd.



Figure 16. Neck chains or straps with index numbers make identification easy.

### DAIRY HERD IMPROVEMENT REGISTRY RECORDS

A unified program of accepting DHIA records as official records has been approved by the National Purebred Dairy Cattle Association. DHIA records accepted by the various breed associations are called Dairy Herd Improvement Registry (DHIR) records. DHIR records are published and used by each breed association in their respective breed improvement and publicity program.

The adoption of the DHIR program eliminates the duplication of reports required for HIR and reduces the cost of an official breed testing program to the dairyman.

To enroll in the DHIR program a purebred breeder must first make application to his breed association. His DHIA records must be computed at a Dairy Records Processing Center. The first 305-day lactation and complete lactations are then reported to the breed association office for those herds enrolled in the Dairy Herd Improvement Registry Program.

All DHIA rules must be followed. Your herd is subject to automatic retests and/or check tests if the herd average is consistently above 500 pounds of butterfat, or if you have individual cows within the herd that exceeded three and one-half pounds of butterfat daily after 90 days following calving.

### THE DHIA SUPERVISOR WORKS WITH YOU

Your DHIA supervisor is trained to help you report accurate test-day data on your herd. If you are enrolled in DHIA, the supervisor records



Figure 17. County milk testing laboratories increase the speed and accuracy of testing.

the necessary information on the pre-listed *Barn Sheet, DHIA-201*. If you are enrolled in OS you are expected to complete the pre-listed *Barn Sheet, DHIA-201* except for the butterfat test. However, your DHIA supervisor will be glad to help you with any points you may not understand. In either case, he will check the *Barn Sheet* for accuracy and completeness, conduct the butterfat tests and mail the necessary reports to the Regional Dairy Records Processing Center.

The DHIA supervisor has the responsibility of verifying the identification of all animals, checking accuracy of test-day data, and seeing that all DHIA rules have been followed explicitly. He also has the responsibility of keeping your *Monthly and Lifetime Herd Books* up to date at all times.

Always feel free to discuss your records with your DHIA supervisor. He can help you interpret your records. He has access to detailed technical information that may help you improve your feeding, breeding, and herd management practices.

## **AGRICULTURAL EXTENSION SERVICE**

Your county agricultural agent and animal husbandry specialists at the New York State College of Agriculture are always available to work with you on herd improvement problems.

### **FOLLOW THESE BASIC STEPS TO HERD IMPROVEMENT**

Join your Dairy Herd Improvement Cooperative

Feed enough high quality forage each day

Feed concentrates indicated

Allow a 60-day dry period

Breed 60 to 90 days after calving

Breed 90 percent of herd to AB proved sires

Grow big replacements

Cull the bottom 20 percent

Maintain herd health

It's in the bag; milk it out

Shoot for 300,000 pounds output per worker

Too many steps? Take the first one and the rest come easy.

Remember, you cannot lift yourself by your boot straps.

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